QP CODE: 25048235

25048235

Reg No : .....

Name : .....

B.Sc DEGREE (CBCS) REGULAR/REAPPEARANCE EXAMINATIONS, NOVEMBER 2025

First Semester

Complementary Course - PH1CMT02 - PHYSICS - PROPERTIES OF MATTER AND THERMODYNAMICS

(Common to B.Sc Chemistry Model I, B.Sc Geology Model I)

2017 Admission Onwards

4DFAE084

Time: 3 Hours

Max. Marks : 60

Part A

*Answer any **ten** questions.*

*Each question carries **1** mark.*

1. What is volume strain?
2. What are the limiting values of Poisson's ratio of a material?
3. Explain the term neutral axis.
4. Distinguish between uniform and non uniform bending.
5. Distinguish between stream line flow and turbulent flow of liquid.
6. Mention any two applications of Stoke's equation.
7. What is the effect of temperature on Brownian motion.
8. Explain Bernoulli's equation.
9. Define open, closed and isolated Systems?
10. State the conditions for a process to be a reversible one?
11. Explain the term internal energy?
12. Define enthalpy?

(10×1=10)

Part B

*Answer any **six** questions.*

*Each question carries **5** marks.*

13. In shafts, do you prefer hollow cylinder over solid? Explain with necessary theory.

14. A uniform metal disc of radius 5 cm and mass 1000 g is fixed symmetrically to the lower end of a torsion wire of length 100 cm and diameter 1.2 mm, the upper end of which is fixed. The time period of torsional oscillations is 6 s. Calculate the rigidity modulus of the material of the wire.

15. Calculate the work done in blowing a soap bubble of radius 10 cm. Surface tension of soap solution is 30×10^{-3} N/m. What is the additional work that will be performed in further blowing it to double its radius?

16. Define coefficient of viscosity of a fluid. Determine its dimensional formula.

17. Describe constant pressure head method to determine the viscosity of a liquid.

18. Show that the slope of an adiabatic curve is γ times the slope of an isothermal curve?

19. The efficiency of a Carnot's engine is 0.5. If the temperature of the sink is reduced by 60 K the efficiency becomes 0.6. Find the temperature of the source and the sink.

20. One gram molecule of a gas expands isothermally to three times its original volume. Calculate the change in entropy. R= 8.3 J/mole/K.

21. State and explain third law of thermodynamics and briefly explain the concept of entropy.

(6×5=30)

Part C

*Answer any **two** questions.*

*Each question carries **10** marks.*

22. Explain the term rigidity modulus of the material. Derive an expression for the couple required to twist a cylindrical rod of circular cross section through an angle θ at one end, the other end being kept fixed, and hence deduce an expression for the rigidity modulus of the rod.

23. What do you mean by Rigidity modulus of the material? Explain with necessary theory how rigidity modulus of material, taken in the form of a rod, can be determined using static torsion apparatus.

24. Explain the different factors affecting surface tension and discuss various applications of surface tension.

25. What is the principle behind the working of a refrigerator? Define coefficient of performance and derive a relation connecting coefficient of performance and efficiency of a carnot's engine. State the second law of thermodynamics.

(2×10=20)